PM_{10} SIP/Maintenance Plan Evaluation Report: Provo City Power – Power Plant

Utah County Nonattainment Area

Utah Division of Air Quality

Major New Source Review Section

October 1, 2015

PM_{10} /SIP/MAINTENANCE PLAN EVALUATION REPORT
Provo City Power – Power Plant

1.0 Introduction

This evaluation report (report) provides Technical Support for Section IX, Part H.1 and Section IX, Part H.3 of the Utah Maintenance Plan; to address the Utah County PM_{10} Nonattainment Area. This document specifically serves as an evaluation of the Payson City Power Plant.

Note on document identification: The intention of the Utah Division of Air Quality is to develop a Maintenance Plan to address PM_{10}. As part of this effort, SIP Subsections IX.H.1 Emission Limits and Operating Practices – General Requirements, IX.H.2 Source-Specific Particulate Emission Limitations in Salt Lake and Davis Counties and IX.H.3 Source-Specific Particulate Emission Limitations for Utah County will be repealed and replaced. Subsection IX.H.4 will be repealed and replaced with Interim Emission Limits and Operating Practices. This subsection provides interim limits, consistent with the limits codified in the $PM_{2.5}$ SIP, until future controls have been implemented within timeframes identified in Section IX Part H.2.

This evaluation report references the SIP version originally dated June 28, and made effective by EPA on August 8, 1994. This SIP version is often referred to as the "original SIP." The Utah County portion of the SIP was further updated on June 5, 2002 and made effective by EPA on January 22, 2003. Additional SIP revisions were adopted by the Air Quality Board on July 6, 2005 and became state law on August 1, 2005. However, this version of the SIP was not adopted by EPA and therefore never became federal law.

In order to distinguish between the various documents in this report, the following coding scheme will be used:

- Since Section IX.H of the 2005 State-only SIP will be repealed entirely and will not be referred to in this report.
- When referencing the original SIP with an effective date of August 8, 1994 the qualifier $^{\{OS\}}$ will follow any citation from that document.
- In reference to the updated Utah County SIP with an effective date of January 22, 2003 the qualifier $^{\{UC\}}$ will follow any citation from that document.
- When referencing any new SIP condition or requirement, the citation will be left blank.

Therefore, a particular sentence of this document might read as follows:

SIP Subsection IX.H.1.c – Stack Testing supersedes 2.a.A$^{\{OS\}}$ from the original SIP.

2.0 Facility Identification

Name: Provo City Power – Power Plant
Address: 702 North 300 West, Provo, Utah, Utah County
Owner/Operator: Provo City Power
UTM coordinates: 443,455 East 4,454,710 North Zone 12

3.0 Facility Process Summary

Provo City Power (PCP) operates a power plant consisting of four 2,585 kW dual-fuel internal combustion (IC) engines. There are also four diesel day-tanks and an emergency generator located on site. The plant is operated as a peaking and supplemental power plant to provide electrical power to municipal power customers in and around the City of Provo. PCP is defined as a Title V major source located in Utah County, and within the Provo, Utah $PM_{2.5}$ nonattainment area.

Operation of the plant is dependent on local demand and cost of utility power. The IC engines operate primarily on natural gas, with ultra-low sulfur diesel fuel used for startup.

4.0 Facility Criteria Air Pollutant Emissions Sources

The facility consists of the following emission sources

- 2,585 kW dual-fuel fired IC engine (IC #1)
- 2,585 kW dual-fuel fired IC engine (IC #2)
- 2,585 kW dual-fuel fired IC engine (IC #3)
- 2,585 kW dual-fuel fired IC engine (IC #4)
- Diesel day-tank #1
- Diesel day-tank #2
- Diesel day-tank #3
- Diesel day-tank #4
- Emergency generator (Em Gen)

5.0 Facility 2011 Baseline Actual Emissions and Current PTE

PCP operates sporadically as a peaking plant and as a part of the general municipal power generator network resulting in low actual emissions compared to its potential to emit for all pollutants.

Table 1: Comparison of Actual and Potential Emissions

Pollutant	Actual Emissions (Tons/Year)[1]	Potential to Emit (Tons/Year)[2]
PM_{10}	0.07	14.50
SO_2	<0.01	4.00
NO_x	5.24	254.00

[1] PCP's 2011 actual emissions
[2] PTE's for PCP's AO issued DAQE-AN107950012-15, dated May 6, 2015

6.0 Projected Emissions for 2019

A modified version of the PTE values was used in the modeled attainment demonstration. The projected emission values for 2019 were calculated from limits given in PCP's current AO, the $PM_{2.5}$ SIP, and the 2011 inventory submittal. PCP is limited to 254 tons per year of NO_x for all engines combined (IC #1-4). The engines are started with diesel and fueled the remaining time with natural gas. It was assumed that the engines would be fueled by diesel for the equivalent amount of time in 2019 as in 2011. The engines were then allowed to operate equivalently until the 254 tons per year NO_x limit was reached.

Table 3: 2019 Projected Emission Values or Modeled Emission Values

Pollutant	Potential to Emit (Tons/Year)
PM_{10}	2.00
SO_2	0.09
NO_x	254

7.0 Comparison of Requirements – Original SIP and New Maintenance Plan

PCP is a previously listed SIP source. In the original PM_{10} SIP document for Utah County, requirements and limits for Provo City Power are found in IX.1.2.J$^{\{OS\}}$. In the 2003 Utah County SIP, requirements and limits for Provo City Power are found in I.1.b.D $^{\{UC\}}$.

Although a specific application of new RACT analysis is not a requirement of the maintenance plan, the limitations found within this maintenance plan are based on the most recent $PM_{2.5}$ Section of the SIP. This section of the SIP required the application of RACT above and beyond the existing controls already required of most listed PM_{10} SIP sources. The conditions, requirements and emission limitations contained within this maintenance plan are based on those in Sections IX.H.11, IX.H.12 and IX.H.13 – which comprise the $PM_{2.5}$ sections of the SIP, and include this additional RACT application. All requirements from the original PM_{10} SIP that have not been superseded or replaced, and which are still necessary, will also be retained. By necessary, meaning: needed in the demonstration of attainment of the 24-hour standard, or in demonstrating that no backsliding in the application of RACT has taken place.

All limits in this maintenance plan are based on the limits in the $PM_{2.5}$ SIP; either in the general requirements of subsection IX.H.11 or the source specific requirements of IX.H.12.k. Therefore, a comparison between the original SIP requirements, and those found in this new maintenance plan can be found below.

7.1 2002 SIP General Requirements

The following is a list of the requirements from the Utah County $^{\{UC\}}$ SIP. A discussion of the requirements including current relevance and expected changes is included.

IX.H.1.a General Requirements {UC}

Requirement IX.H.1.a.A. Stack Testing{UC} – this subsection covered the general methods and procedures for conducting stack testing for PM_{10}, SO_2, and NO_x, including the establishment of a pretest protocol, pretest conference, the use of specific EPA test methods, and acceptable production video.

Discussion This subsection has since been updated and superseded by SIP subsection IX.H.1.e which incorporates equivalent language.

Requirement IX.H.1.a.B Compliance with Annual Limitations {UC} – Compliance with the annual limitations shall be determined based on a rolling 12 month total. On the first day of each month a new 12-month total shall be calculated using the previous 12 months.

Discussion This limitation is no longer needed as the annual PM_{10} standard no longer exists. Daily limits are expected to be included in the source specific sections of the SIP. Also, no source-specific annual SIP Caps appear in either IX.H.2 or IX.H.3 of the revised SIP.

Requirement IX.1.a.C Recordkeeping Requirements{UC} – Records of all information used to show compliance shall be kept for all periods when the plant is in operation. These records shall be made available to the Executive Secretary upon request, and shall include a period of two years ending with the date of the request. This recordkeeping requirement includes records of startup/shutdown implementation procedures, as well as CEMS testing data and stack testing data, as applicable.

Discussion This subsection has since been superseded by SIP subsection IX.H.1.c which incorporates equivalent language.

Requirement IX.1.a.D Proper Maintenance {UC} – established that all facilities need to be adequately and properly maintained.

Discussion This is inherent in the NSR permitting program and is no longer needs to be included.

Requirement IX.1.a.E Definitions {UC} – The definitions contained in R307-101-2, Definitions, apply to Section IX. Part H.

Discussion This subsection has since been superseded by SIP subsection IX.H.1.b which incorporates equivalent language.

Requirement IX.1.a.F Visible Emission Limitations {UC} –Visible emissions shall be as follows except as otherwise designated in specific source subsections: Baghouse applications shall not exceed 10% opacity; scrubber and ESP applications shall not exceed 15% opacity; combustion sources without control facilities shall not exceed 10% opacity; and fugitive emissions shall not exceed 15% opacity; fugitive dust and all other sources shall not exceed 20% opacity.

Discussion This subsection has since been superseded by SIP subsection IX.H.1.f which incorporates equivalent language.

Requirement IX.1.a.G Opacity Observations {UC} - Opacity observations of emissions from stationary sources shall be conducted in accordance with 40 CFR 60, Appendix A, Method 9. For intermittent sources and mobile sources opacity observations shall be conducted using procedures similar to Method 9, but the requirement for observations to be made at 15 second intervals over a six minute period shall not apply and any time interval with no visible emissions shall not be included.

Discussion This subsection has since been superseded by SIP subsection IX.H.1.f, which incorporates equivalent language.

Requirement IX.1.a.H Control of Fugitive Dust from Mobile Equipment - All unpaved operational areas which are used by mobile equipment shall be water sprayed and/or chemically treated to reduce fugitive dust. Control is required at all times (24 hours per day every day) for the duration of the project/operation. The application rate of water shall be a minimum of 0.25 gallons per square yard. Application shall be made at least once every two hours during all times the installation is in use unless daily rainfall exceeds .10 of an inch or the road is in a muddy condition or if it is covered with snow or if the ambient temperature falls below freezing or if the surfaces are in a moist/damp condition. If chemical treatment is to be used, the plan must be approved by the Executive Secretary. Records of water treatment shall be kept for all periods when the plant is in operation. The records shall include the following items:

A. Date
B. Number of treatments made, dilution ratio, and quantity
C. Rainfall received, if any, and approximate amount
D. Time of day treatments were made

Records of treatment shall be made available to the Executive Secretary upon request and shall include a period of two years ending with the date of the request.

Discussion PCP will be required to comply with the most recently EPA approved Fugitive Emissions and Fugitive Dust rule.

7.2 SIP Source Specific Requirements

PCP specific limits and requirements from the 2003 Utah County SIP{UC} are given below.

IX.1.b.E Provo City Power

IX.1.b.D.1. NO_x emissions from the operation of all engines and boilers at the plant shall not exceed 2.45 tons per day.

The following equation shall be used to calculate the daily emissions from each engine:

(Power production in kW-hr/day) x (Emission rate in gram/kW-hr) x (1 lb/453.59 g) x (1 ton/2000 Ibs) = tons/day.

IX.1.b.D.2. NO_x emissions from the operation of all engines and boilers at the plant shall not exceed 254 tons per year.

The following equation shall be used to calculate the annual emissions from each engine:

(Power production in kW-hr/rolling 12-month period) x (Emission rate in gram/kW-hr) x (1 lb/453.59 g) x (1 ton/2000 Ibs) =tons/yr

This is the same limit that is in the Utah County SIP[uc].

IX.1.b.D.3. Stack testing to show compliance with the above NO_x emission limitations and to update the emission rate factor used in Conditions 1 and 2 above shall be performed as follows:

Boiler No.4 and Boiler No.5 shall each be tested every 8,760 hours of operation arid at least once every three years.

Each engine shall be tested every 8,760 hours of operation and at least every three years.

IX.1.b.D.4. Total plant emissions shall be the sum of emissions from each of engines and boilers. The emission rates to be used in the equations listed in conditions 1 and 2 above shall be the most recent stack test results. Power production rates shall be determined by Watt Hour meters on each of

engine and boiler generators. The total amount of kilowatt-hours generated by each engine or boiler shall be recorded on both a daily and a monthly basis.

Limit Discussion

The limits reference boilers that have been removed from PCP, have been removed from the source and will be removed in the updated SIP. The yearly limit, IX.1.b.D.2., is no longer applicable to the PM_{10} SIP; a 24 hour NAAQS now applies. This requirement will be removed from with the updated SIP. Additionally, the stack testing frequency for the engines will be increased to at least once every three years.

7.3 New Maintenance Plan – General Requirements

General requirements have been updated from the Utah County SIP {UC} and are included in the following discussion. The updated general requirements for all listed sources are found in SIP Subsection IX.H.1. This serves as a means of consolidating all commonly used and often repeated requirements into a central location for consistency and ease of reference.

Conditions 1.a, 1.b and 1.d are declaratory statements and define the framework of the other SIP conditions. They have little in the way of compliance provisions. Condition 1.c is the primary recordkeeping requirement and is further discussed in section 4.2. Conditions 1.e and 1.f serve as the mechanism through which sources conduct monitoring for the verification of compliance with a particular emission limitation.

Requirement This paragraph states that the terms and conditions of Subsection IX.H.1 apply to all sources subsequently addressed in the following subsections IX.H.2 and IX.H.3. It also clarifies that should any inconsistency exist between the general requirements and the source specific requirements that the source specific requirements take precedence.

Discussion This paragraph states that the terms and conditions of Subsection IX.H.1 apply to all sources subsequently addressed in the following subsections IX.H.2 and IX.H.3. It also clarifies that should any inconsistency exist between the general requirements and the source specific requirements, then the source specific requirements take precedence.

Requirement IX.H.1.b The definitions contained in R307-101-2, Definitions, apply to Section IX, Part H.

Discussion This requirement states that the definitions found in State Rule 307-101-2, Definitions, apply to SIP Section IX.H. Since this is stated for the Section (IX.H), it applies equally to IX.H.1, IX.H.2 and IX.H.3.

Requirement IX.H.1.c Any information used to determine compliance shall be recorded for all periods when the source is in operation, and such records shall be kept for a minimum of five years. Any or all of these records shall be made available to the Director upon request.

Discussion This is a recordkeeping provision. Information used to determine compliance shall be recorded for all periods the source is in operation, maintained for a minimum period of five (5) years, and made available to the Director upon request. As the general recordkeeping requirement of Section IX.H, it will often be referred to and/or discussed as part of the compliance demonstration provisions for other general or source specific conditions.

Requirement IX.H.1.d All emission limitations listed in Subsections IX.H.2 and IX.H.3 apply at all times, unless otherwise specified in the source specific conditions listed in IX.H.2 and 3.

Discussion This requirement states that emission limitations apply at all times that the source or emitting unit is in operation, unless otherwise specified in the source specific conditions listed in IX.H.2 or IX.H.3. There may be conditions that

It may be that specific sources have separate defined limits that apply during alternate operating periods (such as during startup or shutdown), and these limits will be defined in the source specific conditions of either IX.H.2 or IX.H.3.

Requirement IX.H.1.e Stack Testing:

i. As applicable, stack testing to show compliance with the emission limitations for the sources in Subsection IX.H.2 and 3 shall be performed in accordance with the following:

A. Sample Location: The emission point shall be designed to conform to the requirements of 40 CFR 60, Appendix A, Method 1, or other EPA-approved methods acceptable to the Director.

B. Volumetric Flow Rate: 40 CFR 60, Appendix A, Method 2 or other EPA-approved testing methods acceptable to the Director.

C. PM_{10}: 40 CFR 51, Appendix M, Methods 201a and 202, or other EPA approved testing methods acceptable to the Director. If a method other than 201a is used, the portion of the front half of the catch considered PM_{10} shall be based on information in Appendix B of the fifth edition of the EPA document, AP-42, or other data acceptable to the Director.

D. SO_2: 40 CFR 60 Appendix A, Method 6C or other EPA-approved testing methods acceptable to the Director.

E. NO_x: 40 CFR 60 Appendix A, Method 7E or other EPA-approved testing methods acceptable to the Director.

F. Calculations: To determine mass emission rates (lb/hr, etc.) the pollutant concentration as determined by the appropriate methods above shall be multiplied by the volumetric flow rate and any necessary conversion factors to give the results in the specified units of the emission limitation.

G. A stack test protocol shall be provided at least 30 days prior to the test. A pretest conference shall be held if directed by the Director. The emission point shall be designed to conform to the requirements of 40 CFR 60, Appendix A, Method 1, and Occupational Safety and Health Administration (OSHA) approvable access shall be provided to the test location.

H. The production rate during all compliance testing shall be no less than 90% of the maximum production rate achieved in the previous three (3) years. If the desired production rate is not achieved at the time of the test, the maximum production rate shall be 110% of the tested achieved rate, but not more than the maximum allowable production rate. This new allowable maximum production rate shall remain in effect until successfully tested at a higher rate. The owner/operator shall request a higher production rate when necessary. Testing at no less than 90% of the higher rate shall be conducted. A new maximum production rate (110% of the new rate) will then be allowed if the test is successful. This process may be repeated until the maximum allowable production rate is achieved.

Discussion This is the main stack testing condition, and outlines the specific requirements for demonstrating compliance through stack testing. Several subsections detailing Sample Location, Volumetric Flow Rate, Calculation Methodologies and Stack Test Protocols are all included – as well as those which list the specific accepted test methods for each emitted pollutant species (PM_{10}, NO_x, or SO_2). Finally, this subsection also discusses the need to test at an acceptable production rate, and that production is limited to a set ratio of the tested rate.

These stack testing requirements supersede those found in IX.H.1.a.$A^{\{OS\}}$ and IX.H.2.a.$A^{\{OS\}}$ of the original SIP.

Requirement IX.H.1.f Continuous Emission and Opacity Monitoring.

i. For all continuous monitoring devices, the following shall apply:
   A. Except for system breakdown, repairs, calibration checks, and zero and span adjustments required under paragraph (d) 40 CFR 60.13, the owner/operator of an affected source shall continuously operate all required continuous monitoring systems and shall meet minimum frequency of operation requirements as outlined in R307-170 and 40 CFR 60.13.
   B. The monitoring system shall comply with all applicable sections of R307-170; 40 CFR 13; and 40 CFR 60, Appendix B – Performance Specifications.

ii. Opacity observations of emissions from stationary sources shall be conducted in accordance with 40 CFR 60, Appendix A, Method 9.

Discussion This condition covers the use of CEMs and opacity monitoring. While it specifically details the rules governing the use of continuous monitors (both emission monitors and opacity monitors), it also covers visible opacity observations through the use of EPA reference method 9.

These requirements specifically supersede those found in IX.H.1.a.C$^{\{OS\}}$ and IX.H.2.a.C$^{\{OS\}}$ of the original SIP. The original SIP requirements of IX.H.1.a.B$^{\{OS\}}$ and IX.H.2.a.B$^{\{OS\}}$, both of which addressed individual equipment opacity, will be superseded as necessary by the particular source specific limitations found in IX.H.2 or IX.H.3.

Limit Discussion

This condition covers the use of CEMs and opacity monitoring. While it specifically details the rules governing the use of continuous monitors (both emission monitors and opacity monitors), it also covers visible opacity observations through the use of EPA reference method 9.

These requirements specifically supersede those found in IX.H.1.a.C$^{\{OS\}}$ and IX.H.2.a.C$^{\{OS\}}$ of the original SIP. The original SIP requirements of IX.H.1.a.B$^{\{OS\}}$ and IX.H.2.a.B$^{\{OS\}}$, both of which addressed individual equipment opacity, will be superseded as necessary by the particular source specific limitations found in IX.H.2 or IX.H.3.

7.4 New Maintenance Plan – PCP Specific Requirements

IX.H.3. e Provo City Power: Power Plant

i. NO_x emissions from the operation of all engines at the plant shall not exceed 2.45 tons per day.

ii. Compliance with the emission limitation shall be determined by summing the emissions from all the engines. Emission from each engine shall be calculated from the following equation:

Emissions (tons/day): (Power production in kW-hr/day) x (Emission factor in gram/kW-hr) x (1 lb/453.59 g) x (1 ton/2000 lbs) = tons/day

a. The NO_x emission factor for each engine shall be derived from the most recent stack test. Stack tests shall be performed in accordance with IX.H.1.e. Each engine shall be tested every 8,760 hours of operation or at least every three years from the previous test, whichever occurs first.

b. NO_x emissions shall be calculated on a daily basis.

c. A day is equivalent to the time period from midnight to the following midnight.

d. The number of kilowatt hours generated by each engine shall be recorded on a daily basis with an electrical meter.

Limit Discussion

PCP is limited to 2.45 tons per day of NO_x with stack tests every three years to verify emission factors. Stack testing has already been completed and emission factors determined from this sampling will be used in place of an initial stack test. The condition also includes the definition of a day as being from midnight until the following midnight. Also, the boiler references were removed from the limits, as they have been removed.

8.0 Monitoring, Recordkeeping and Reporting

Monitoring requirements are found in the general requirement IX.H.1.e and all common recordkeeping and reporting provisions have been consolidated in the general requirements under IX.H.1.c.

Monitoring of the NO_x emission limit, IX.H.3.g.i, is determined by maintaining daily records of emissions. The emissions are determined from data gathered from the engine's stack test and the power generated by that engine.

9.0 Discussion of Attainment Demonstration

The general requirements act as a framework upon which the other requirements can build. Second, they demonstrate a prevention of backsliding. Through the use of general requirements that are either the same as or functionally equivalent to those in the 2003 Utah County SIP, backsliding has been prevented. Finally, when a general requirement has been removed, careful consideration was given as to its specific need, and whether its retention

would in any way aid in the demonstration of attainment with the 24-hr standard. If no argument could be made in that regard, the requirement was simply removed.

The source specific limits are equivalent to the requirements from the 2003 Utah County SIP. Requirements that were removed included the yearly NO_x emission limits, as there is no yearly standard. Monitoring, recordkeeping, and reporting requirements were updated with an increased stack testing frequency.

10.0 Implementation Schedule

The requirements imposed on the PCP are effective immediately. PCP did not have any required RACT modifications to undertake from the $PM_{2.5}$ SIP RACT requirements. The emission limits listed in IX.H.3.g can be applied immediately. Similarly, the general requirements, IX.H.1.a-f, can also be applied immediately.

11.0 Emission Limits

Annual and daily emissions are given below.

Table 4: Yearly Emissions and Daily Emission Limits

All values in tons	NO_x
Annual	$254.00^{\{uc\}}$
Daily (24-hr)	2.45

7.0 References

To be included with final version

Evaluation Report –

UTAH PM_{10} SIP/MAINTENANCE PLAN

Utah County Nonattainment Area

Supporting Information